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ABSTRACT

Examined is the relationship between three documents intended to guide the development and evaluation of programs for the education of science teachers, namely: the "Recommended Standards" prepared by the National Council for Accreditation of Teacher Education, the booklet "Developing Guidelines in Teacher Education" prepared by the Association Organizations for Teacher Education, and the "Guidelines" of the Association for the Education of Teachers in Science (AETS). The preparation of each of these is described, and points at which each bears on the others identified. Recommendations are made for a re-examination of the AETS "Criteria for Evaluating the Professional Component of Science Teacher Education". [Not available in hardcopy due to marginal legibility of original document.] (EB)

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Evaluating the Effectiveness of Programs in Science Teacher Education in the 1970's*

(Frank X. Sutman, Temple University, Philadelphia, Pa.)

The National Council for Accreditation of Teacher Education (NCATE) is a part of the complex organization, in the United States, responsible for the preparation of teachers. NCATE is, in a sense, the check built into what is often referred to as "The Establishment." Through NCATE the establishment scrutinizes itself. And this process occurs in part as individual teacher training institutions examine the effectiveness of their programs prior to an evaluation by an NCATE team.

The NCATE constitution calls for continuous evaluation and revision of standards by which teacher education programs are judged. By a mandate from the National Commission on Accrediting, the Evaluative Criteria Study Committee of the American Association of Colleges for Teacher Education (AACTE) recommends revised standards to NCATE to be used in the evaluation process.

Over three years ago AACTE put into operation a detailed study of the then accepted NCATE Standards. This study led to an almost total revision of the Standards. It is the product of this revision process, and its relation to science teacher education, that is being reported on here.

Involvement of Professional Organizations

Another arm of AACTE is a group representing some 23 professional organizations: The Associated Organizations for Teacher Education. This group has an Advisory Committee on which AETS has representation. Beginning in 1962 Harold Tannenbaum and David Sarner were the first AETS representatives on the AOTE Advisory Committee. The writer is the single present representative.

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SE 008 331

It was through this representation that members of AETS (along with other professional organizations) informed the AACTE Evaluative Criteria Committee that AETS believed it had an important role to play in developing standards to be used in the evaluation of programs at institutions responsible for the preparation of science teachers. Some three years ago, a questionnaire was sent to a random sample of twenty members of AETS seeking advise as input to the AACTE Evaluative Criteria Committee. The response from the AETS members was 100 percent. And one of the points of agreement was that AETS, the professional organization concerned with science teacher education, wanted to have much to say about the approval or rejection of college programs designed to prepare science teachers. AETS was not alone. A number of other professional organizations had similar concern. Examples of organizations requesting this type of professional involvement in the accreditation process were, the Council for Exceptional Children, the National Council of Teachers of English, the Philosophy of Education Society, and the American Library Association.

Because of the concern by a number of professional organizations the Evaluative Criteria Committee built into its recommended revised standards for teacher education an opportunity for colleges and universities to utilize "guidelines" developed by the various learned professional societies and professional organizations. Note for example a quotation (related to the evaluation of "Curricula of Basic Programs") taken from the final draft of the 1969 Recommended Standards for Teacher Education.

> National learned societies and professional associations with special interest in curricula for the preparation of teachers have significant contributions to make to the improvement of teacher education programs. On the basis of extensive study and research, some of these organizations have developed guidelines for the preparation of teachers. It is expected that an institution

will work out the rationale for its various teacher education curricula with due consideration given to such guidelines appropriate to the elements in the professional studies component. Due consideration means that the institution is acquainted with these guidelines and has critically examined them in relation to developing the teacher education curricula offered.

Standard: In planning and developing curricula for teacher education, the institution gives due consideration to guidelines for teacher preparation developed by national learned societies and professional associations.[1]

Also note a quotation from the section of the Standards "Curricula for Advanced Programs."

National learned societies and professional associations with special interest in curricula for the preparation of school personnel have significant contributions to make to the improvement of advanced programs. On the basis of extensive study and research, some of these organizations have developed guidelines for the advanced preparation of teachers and other professional school personnel. It is expected that an institution will work out the rationale for its advanced curricula with due consideration given to such guidelines appropriate to the respective advanced programs offered. Due consideration means that the institution is acquainted with these guidelines and has examined them critically in relation to developing its advanced curricula.[2]

Guidelines for Science Teacher Education

During the development of the new Standards AETS, under the direction of Wayne Taylor, was preparing its own guidelines[3] for the professional component of science teacher education. These were unveiled about a year and a half ago. And of course the American Association for the Advancement of Science (AAAS) in cooperation with the National Association of State Directors for Teacher Education and Certification (NASDTEC), nearly ten years ago, published guidelines for the science content component of preservice programs in science teacher education.[4] These guidelines presently are under revision.

AOTE's Guidelines to Guidelines

But what of the many professional fields related to teacher education programs for which guidelines are not available? And how effectively can

teacher education institutions utilize available guidelines; especially in relation to the new NCATE Standards?

The AOTE Advisory Committee, aware of the difficulties implicit in these questions appointed a task force to prepare a document designed to aid professional societies considering the development of guidelines. This AOTE document, a service to its membership, takes the form of the booklet Developing Guidelines in Teacher Education The Role of Professional Associations and Learned Societies in the Process of Accreditation in Teacher Education.[5] The booklet was distributed to all members of AOTE and to non member societies that indicated an interest in the project. Representatives of 35 professional societies[6] attended a conference, sponsored by AOTE, concerned with the special needs of professional groups. These needs served as input to the AOTE task force that prepared the Developing Guidelines in Teacher Education booklet.

What suggestions does the Guide to Guidelines give to each professional group about to embark on a project of preparing guidelines for teacher education programs? Three sections of the guide respond to this question: the "Development of Guidelines" section; the "Format, Terminology, and Substance" section; and the section on "Special Interests and General Concerns." In the "Development of Guidelines" section each professional organization is referred to the new NCATE Standards; to the need for collecting a variety of relevant material from journals, yearbooks, and to the need to consider policy statements of the organization. The identification and statement of issues is referred to as the heart of the developmental procedure. "For here membership involvement occurs. And only through extensive membership participation can issues be clearly resolved and satisfaction reasonably assured." [7] Also, in this section the suggestion is made that an organization call a conference of

representative membership to present position papers on previously defined issues. If funds are not available for this activity it is suggested that the national convention time could be directed toward this part of the guidelines development process. And finally it is suggested that when tentative guidelines are developed these should be reacted to by the membership, revisions should result from these reactions, and then some form of exploratory application of the guidelines should take place, if possible involving several differing programs. "Both the practical consequences and the clarity of communication will be tested in such a trial use." [8]

As final steps (the final draft of the guidelines, at least a third draft) the organization must accept them by "appropriate organizational means." Yet, hopefully, the developed guidelines will remain under continuing study and revision. "A reciprocal relationship between standards (NCATE) and guidelines (developed by organizations) as each responds to new circumstances and new knowledge can only result in greater usefulness and greater influence for both." [9]

One paragraph from the section on "Format Terminology and Substance" appears to be particularly cogent to the purpose of this report:

> In developing guidelines to supplement the proposed standards organizations will need to make decisions concerning relative emphasis on process or product, resources for, or commitment to teacher education in institutional programs. The need to devise means for assessing the quality of the teachers and other school personnel prepared by institutional programs challenges professional organizations to special efforts in this area. Clearly such means are not now well developed and research which would lead to the development of evaluative instruments and procedures must be increased. The guidelines of professional associations will need to recognize both the importance of evaluative procedures and the lack of effective means at the present time.[10]

But the final section; "Special Interests and General Concerns" is of such great importance to our considerations here that it is most appropriate to quote this section in its entirety.

The role of the professional organizations and learned societies in setting standards for the preparation of teachers is not easily resolved. It was, infact, a major issue considered at length by AACTE's Evaluative Criteria Study Committee. The present provisions for indirect participation of the interested organizations in the accreditation process through consideration of organizational guidelines are not universally regarded as an ideal solution to the problem. It has been said that any attempt to incorporate the recommendations of all organizations in a single program would result in a program of teacher preparation which would require at least ten years to complete. In other words, the specialized requirements of the various professional groups may be so comprehensive and complex that they cannot be seriously considered in any practical assessment of program. Distasteful as it may seem, this quite cynical statement is not completely unjustified. Standards and guidelines developed by various professional organizations are not always compatible; major inconsistencies and discontinuities do appear; attempts to satisfy all recommendations within a single teacher preparation program might well lead to frustration; and organizational structures for resolving potential conflicts and developing compatible systems do not exist.

> If the procedures for the use of organizational guidelines to supplement accreditation standards are to fulfill their stated purpose, the organizations concerned must do more than develop excellent statements of guidelines for their own fields. They must, in addition, devise ways of working with other organizations to develop recommendations which can be implemented simultaneously, which provide balance and flexibility in the program for preparation of teachers and which are respected and considered by all groups because they provide for the legitimate interests of each. [11]

From the above quotations the reader obtains the flavor of the AOTE booklet, and the reader senses the urgency, the sensitivity, and the mixed feelings for the entire evaluation process.

Unique Features of the NCATE Standards

We now have before us three documents to relate in considering some reasonable recommendations for action by AETS: (1) the Recommended Standards for NCATE evaluation, (2) the AOTE booklet: Developing Guidelines in Teacher Education, and the AETS Guidelines. But before these can be related in a meaningful way it is useful first to consider in some detail additional features of the new NCATE Standards.

The question arises why should there be a system of national accreditation?

The introduction to the Standards answer this question in the following way.[12]

National accreditation of teacher education serves four major purposes:

1. To assure the public that particular institutions .... offer programs for the preparation of teachers and other professional school personnel that meet national standards of quality.

2. To ensure that children and youth are served by well prepared school personnel.

3. To advance the teaching profession through the improvement of preparation programs.

4. To provide a practical basis for reciprocity among the states in certifying professional school personnel.

Having considered the purpose of accreditation, a next reasonable question relates to the flexibility of the standards, used in the accrediting process, to meet special institutional and social needs.

Once again the introduction to the Standards responds as follows:

> Responsible experimentation and innovation are essential to improvement of teacher education programs. A deliberate attempt has been made in these standards to encourage individuality, imagination, and innovation in institutional planning. An institution must of course assume responsibility for the quality of all its programs, regular and experimental.[13]

A final question concerns examples of useful innovations within the new standards to meet today's understandings and professional concerns. Two innovations are of particular concern. First is student participation in program evaluation and development. The standard read "The institution has respresentative student participation in the evaluation and development of its teacher education programs." And the discussion of this standard states in part: "Through student organizations, through joint student-faculty groups and/or through membership on faculty committees they have clear channels and frequent opportunities to express their views with the assurance that their proposals will influence the development of the teacher education programs offered by the institution." [14]

A second innovation is concerned with evaluation of the product or graduate of the particular program.

The standard related to this innovation states:

> The institution conducts a well defined plan for evaluating the teachers it prepares.

And a portion of the discussion related to this standard states:

> The ultimate criterion for judging a teacher education program is whether it produces competent graduates who enter the profession and perform effectively...The institution evaluates the teachers it produces at two critical points: when they complete their programs as students and after they enter the teaching profession.
>
> It is recognized that the means now available for making such evaluations are not fully adequate. Nevertheless the standard assumes that an institution evaluates the teachers it prepares with the best means now available, and that it attempts to develop improved means for making such evaluations.[15]

Two activities related to this standard deserve mention here. First is the discussion paper, presented by Asahel Woodruff before the AACTE meeting in February 1968 titled Accreditation by Evaluation of the Product: What it Means for Teacher Education Programs.[16] This paper attempts in a scholarly way to consider the problem of product evaluation. The paper is available through AACTE Offices in Washington, D.C.

The second activity recently instituted by AOTE "requests the ERIC Clearinghouse on Teacher Education to commission an annotated bibliography on means of assessing programs of teacher education in terms of the evaluation of the product, as required by the NCATE standards. This bibliography eventually is to be made available to AOTE organizations for distribution to members..."[17]

The final innovation within the Standards, to be considered here, is one referred to earlier in this presentation. It is emphasized again to serve as a basis for recommendations made in the final section of this report. The innovation is concerned with continual reexamination of the new NCATE Standards (already developed through at least four revisions), the final one occurring

only after the draft was tested in a variety of types of colleges where teacher education programs were to be evaluated. Reference to "Continuous Review of NCATE Standards" in the introduction to the document was referred to earlier. A pertinent segment of this section is quoted below.

> Responsibility for carrying on a systematic program of evaluation of standards...shall be allocated to the AACTE. The AACTE shall ensure the participation of representatives from institutions, organizations, and fields of study concerned with teacher education, and the Council. The AACTE shall receive and consider recommendations about existing or revised standards from institutions which prepare teachers and from individuals and organizations concerned with teacher education.[18]

The Role of AETS - Recommendations

The earlier sections of this presentation indicate that AETS already has been sensitive to its role in the evaluation of programs designed to prepare science teachers. The available Criteria are indicative of this sensitivity. Also the author's article, "Hiding Behind Course Titles"[19] grew out of a presentation of an earlier AETS meeting. The concern for the role AETS and the Commission for the Education of Teachers in Science (CETS) could play in the science education program evaluation process is exemplified by the attached paper presented by Matthew Bruce[20] at the Dallas meeting of AETS one year ago.

In spite of the recency of the completion of the AETS Criteria, the activities of the past years by AOTE and AACTE call for a reexamination of the AETS Criteria. The available Criteria have gotten AETS "off the ground" and can serve as a point from which extensive revision will take place. It is recommended that the Executive Committee of the Association for the Education of Teachers in Science appoint a standing committee to consider appropriate means by which its present "Criteria for Evaluating the Professional Component of Science Teacher Education" be evaluated and revised. It is recommended further that the recommended "AETS Committee on Evaluative Criteria"

allow this report with its references, to influence greatly its thinking. And finally, so that this Committee can most effectively meet its objective, the recommendation is made that the AETS Executive Board seek funds to enable the Committee to function effectively. If these funds are lacking the recommendation is made to dedicate the major portion of the regional and national meetings of AETS to the task of revising the criteria for science teacher education programs.[21]

FOOTNOTES

1. Recommended Standards for Teacher Education, American Association for Colleges of Teacher Education, 1969, p. 6.

2. Ibid, p. 16.

3. "Guidelines for Content of Preservice Professional Education for Secondary School Science Teachers" The Science Teacher Vol. 35; No. 5, May 1968.

4. Guidelines for Preparation Programs of Teachers of Secondary School Science and Mathematics, American Association for the Advancement of Science, Washington, D.C., 1961.

5. Developing Guidelines in Teacher Education, Associated Organizations for Teacher Education, 1969.

6. Ibid, Appendix A.

7. Ibid, p. 10.

8. Ibid, p. 12.

9. Ibid, p. 12.

10. Ibid, p. 14.

11. Ibid, p. 15.

12. AACTE, op.cit., p. 1.

13. AACTE, op.cit., p. 1.

14. AACTE, op.cit., p. 10.

15. AACTE, op.cit., p. 12.

16. Accreditation by Evaluation of the Product: What it Means for Teacher Education Programs, AACTE, 1968.
    Consists of four parts:
    - I. A Guide to Effective Teaching--A Map of Classroom Conditions Required for Producing Behavioral Changes in Students
    - II. Behavioral Objectives for Teachers
    - III. Interpersonal Interaction and Influence
    - IV. Guide to Instructional Analysis

17. Minutes of the AOTE Advisory Committee Meeting, October 15-17, 1969 (See the AETS Newsletter, Spring 1970.)

18. AACTE, op.cit., p. 1.

19. F. Sutman, "Hiding Behind Course Titles" Journal of Research in Science Teaching, 4:2, 1966.

20. Bruce, M. H., "Proposals to CETS" a paper presented at the AETS Meeting March 22, 1969.

21. These recommendations have been submitted to the AETS Executive Committee through the President of AETS.